

CLAIM

1. An apparatus to be used to illuminate an object having an essentially flat surface along a first dimension that extends along a first direction, the apparatus for providing light that is directed onto the flat surface in a direction that has at least some component in the first direction, the

5 apparatus comprising:

a light source that forms a plurality of initial light rays that are directable along a direction essentially perpendicular to the first direction; and

10 a guidance member positioned proximate the light source that intercepts and redirects the initial light rays such that redirected rays exit the guidance member along paths that form angles with the respect to the initial rays and which have a lateral component aligned with the first direction and so that the redirected rays subtend an illuminated portion of the flat surface.

2. The apparatus of claim 1 wherein the light source is positionable such that the initial rays are essentially perpendicular to the flat surface.

3. The apparatus of claim 1 wherein the guidance member redirects the rays such that the redirected rays are essentially parallel to each other.

4. The apparatus of claim 1 wherein the light source is a line light source having a line surface from which light emanates, the source positionable such that the line surface is parallel to the flat surface and extends in the first direction.

5. The apparatus of claim 1 also for collecting images of the illuminated portion of the flat surface and further including a camera set having a field of view and positionable such that the field of view includes at least a segment of the illuminated portion of the flat surface.

6. The apparatus of claim 1 wherein the flat surface has a second dimension perpendicular to the first dimension and wherein the source is positionable such that the initial rays are angled so as to have a longitudinal component aligned with the second direction.

7. The apparatus of claim 1 wherein the guidance member is a prismatic film.

8. The apparatus of claim 7 wherein the source is a line source having a line surface from which light emanates, the source positionable such that the line surface is essentially parallel to the flat surface of the object and extends in the first direction.

9. The apparatus of claim 8 wherein the object is a sheet of material wrapped around a roll such that the first dimension is along the width of the roll and a second dimension is perpendicular to the first dimension and, wherein, the source is positionable essentially parallel to the first dimension.

10. The apparatus of claim 9 wherein the light source has a length dimension along its length that is essentially identical to the first dimension and wherein the light source and guidance member are offsetable with respect to the flat surface along the first direction such that the redirected rays subtend
5 the flat surface along essentially the entire first dimension.

11. The apparatus of claim 9 wherein the initial rays have a longitudinal component in the second direction.

12. The apparatus of claim 11 also for collecting images of the illuminated portion of the flat surface and further including a camera set having a field of view and positionable such that the field of view includes at least a segment of the illuminated portion of the flat surface.

13. The apparatus of claim 1 wherein the guidance member is positioned at least in part between the source and the flat surface.

14. An apparatus for generating images of an object having an essentially flat surface along a first dimension that extends along a first direction, the apparatus comprising:

5 a line light source having a line surface from which a plurality of initial light rays, the source positionable such that the line surface is essentially parallel to the flat surface and extends in the first direction and so that the rays are directed in a direction essentially perpendicular to the first direction

10 a guidance member positioned proximate the light source that intercepts and redirects the initial light rays such that redirected rays exit the guidance member along paths that form angles with respect to the initial rays and which have a lateral component aligned with the first direction and so that the redirected rays subtend an illuminated portion of the flat surface; and

a camera having a field of view and positionable such that the field of view includes at least a segment of the illuminated portion of the flat surface.

15. The apparatus of claim 14 wherein reflected rays emanate from the flat surface and wherein the camera is positionable such that the field of view is within the paths defined by the reflected rays.

16. The apparatus of claim 14 wherein reflected rays emanate from the flat surface and wherein the camera is positionable such that the field of view is outside the paths defined by the reflected rays.

17. The apparatus of claim 14 wherein the light source is positionable such that the initial rays are essentially perpendicular to the flat surface and the redirected rays are essentially parallel to each other.

18. An apparatus for generating images of a material web having a first dimension where the images correspond to web segments having the first dimension and a second dimension perpendicular to the first dimension, the apparatus comprising:

5 a roller that supports the web such that the first dimension is essentially flat and extends along the width of the member in a first direction and the second dimension is perpendicular to the first dimension and is generally aligned with the direction of web movement during winding;

10 a line light source having a line surface from which a plurality of initial light rays emanate, the source positioned such that the line surface is essentially parallel to the first dimension and extends in the first direction and so that the rays are directed in a direction essentially perpendicular to the first direction

15 a guidance member positioned proximate the source that intercepts and redirects the initial light rays such that redirected rays exit the guidance member along paths that form angles with respect to the initial rays and which have a lateral component aligned with the first direction and so that the redirected rays subtend an illuminated portion of the web on the roller; and

20 a camera having a field of view and positioned such that the field of view includes at least a segment of the illuminated portion of the web.

19. The apparatus of claim 18 wherein the initial rays have a longitudinal component in the second direction.

20. The apparatus of claim 18 wherein the guidance member is a prismatic film.